DECLARATION UNDER 37 C.F.R. §1.131 Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450		
	Application Number	10/087,035
	Attorney Docket Number	10011076-1
	Filing Date	February 27, 2002
	First Named Inventor	Robert Kincaid
	Examiner	Carolyn Smith
	Group Art	1631
	Title	*Array design system and methods*

This Declaration and the attached Exhibit are being submitted in conjunction with the Applicants' Response to the Office Action dated September 21, 2004.

I, Robert Kincaid, do hereby declare as follows.

1. I am the inventor of the invention claimed in the above captioned application.

2. I have been asked to declare and provide factual evidence in support of conception of systems and methods for gene-based array design before July 16, 2001.

3. As evidenced by Exhibit A, I conceived of the systems and methods for gene-based array design prior to July 16, 2001. The dates have been redacted from Exhibit A. All redacted dates are prior to July 16, 2001.

4. Exhibit A consists of photocopies of the Invention Disclosure (total of 6 pages) in which details of the gene-based array design systems and methods are described.

5. Pages 1 and 2 of Exhibit A are internal Invention Disclosure forms used by the Legal Department of Agilent Technologies. Pages 3-6 of Exhibit A describe the details of the first conception of the systems and methods for gene-based array design. In brief, a customer requests an array design from a vendor by providing at least one gene of interest. The vendor uses this information to

design probes specific for the gene (or genes) of interest as well as a design for the array. This invention removes the significant burden of probe and array design from the customer when requesting custom arrays.

6. The evidence provided in Exhibit A establishes that I conceived of gene-based array design prior to July 16, 2001.

7. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

Respectfully submitted,

Date: 1/19/05

Robert Kincaid

Attachments: Exhibit A

Agilent Technologies

INVENTION DISCLOSURE

PAGE ONE OF ____

PDNO 10011076 DATE RCVD ATTORNEY GMS/LSBU-BRSU

Instructions: *The information contained in this document is* ***COMPANY CONFIDENTIAL*** *and may not be disclosed to others without prior authorization. Submit this disclosure to the Agilent Technologies Legal Department as soon as possible. No patent protection is possible until a patent application is authorized, prepared, and submitted to the Government.*

Descriptive Title of Invention:

Gene-based array design

Name of Project: Life Science Informatics/Bioscience Information Solutions Department/SSL

Product Name or Number: N/A

Was a description of the invention published, or are you planning to publish? If so, the date(s) and publication(s):
No.

Was the invention disclosed to anyone outside of AGILENT TECHNOLOGIES, or will such disclosure occur? If so, the date(s) and name(s):
This invention has not been disclosed to anyone outside of Agilent Technologies to date.
No.

If any of the above situations will occur within 3 months, call your IP attorney or the Legal Department now at 1-553-3061 or 408-553-3061.

Was the invention described in a lab book or other record? If so, please identify (lab book #, etc.)

No

Was the invention built or tested? If so, the date:

No

Was this invention made under a government contract? If so, the agency and contract number:

No.

Description of Invention: *Please preserve all records of the invention and attach additional pages for the following. Each additional page should be signed and dated by the inventor(s) and witness(es).*

A. Prior solutions and their disadvantages (if available, attach copies of product literature, technical articles, patents, etc.).
B. Problems solved by the invention.
C. Advantages of the invention over what has been done before.
D. Description of the construction and operation of the invention (include appropriate schematic, block, & timing diagrams; drawings; samples; graphs; flowcharts; computer listings; test results; etc.)

Signature of Inventor(s): I (we) hereby submit this disclosure on this date: [ ].

Employee No.	Name	Signature	Telnet	Mailstop	Entity & Lab Name
498473	Robert Kincaid	Robert Kincaid	485-2418	24M-A	42LB/Systems & Solutions

(If more than four inventors, include additional information on another copy of this form and attach to this document)

S1 INVENTION DISCLOSURE

COMPANY CONFIDENTIAL PAGE ____ OF ____

Signature of Witness(es): *(Please try to obtain the signature of the person(s) to whom invention was first disclosed.)*

The invention was first explained to, and understood by, me (us) on this date: [ ]

Full Name	Signature	Date of Signature
Paul Wolber	Paul T. Wolber	
Full Name	Signature	Date of Signature
Matthew Yoshikawa	Matthew Yoshikawa	

Inventor & Home Address Information: *(If more than four inventors, include addl. information on a copy of this form & attach to this document)*

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Do you have a Residential P.O. Address? P.O. BOX	City	State	Zip
No			
Greeted as *(nickname, middle name, etc.)*		Citizenship U.S.A.	

Inventor's Full Nam			
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Greeted as *(nickname, middle name, etc.)*		Citizenship	

Overview of Invention

This disclosure describes a novel approach for allowing microarray customers to design their own custom oligonucleotide arrays. Traditionally, array design is probe-centric and most of the effort goes into selecting the best probes to detect the genetic sequence of interest. In contrast, this invention decouples probe selection from the array layout process. Essentially, it proposes a tool that performs all array design functions except probe selection. With this tool, a customer can specify a design with respect to the intended targets, and probe selection is deferred to the manufacturer.

NOTE for simplicity this disclosure will simply refer to arrays or microarrays, but it should be understood to refer to ***custom oligonucleotide arrays***. Also, for simplicity, the term gene is used to refer to the target nucleic acid for which a oligonucleotide probe is to be designed. This may actually be any nucleic acid target: genomic sequence, an mRNA, a single exon, etc.

Prior solutions and their disadvantages

Prior solutions to designing microarrays, center on selecting the best possible oligonucleotide probes. This usually requires using fairly complicated and specialized computational techniques. These computations as well as the sequence curation that precedes them are generally too technical and burdensome for average customers. Also, the process is very computationally intensive and may required expensive, specialized computing hardware/software. For this reason, customer design of arrays is generally viewed as problematic and unsupportable (from a commercial standpoint). To date the solution to this difficulty is to do all array design (including layout) within Agilent, while consulting with the customer on their requirements.

Problems solved by the invention

This invention simplifies array design both for the customer and for the microarray manufacturer by decoupling probe selection from array layout.

Advantages of the invention over what has been done before

This invention isolates the customer from the burden of sequence curation and probe selection computations, while still offering them the ability to personally select the appropriate layout and design choices for their custom array. In particular they can specify:

1. probe lengths
2. control probe sequences (from a set of standard sequences)
3. control probe layouts
4. number of probes per gene
5. inclusion/exclusion of deletion controls
6. layout patterns
7. precise position of probes on the array (with respect to the genes they represent)
8. Number of features and density of array
9. Number of probes per gene vs. replicate probes
10. etc.

Further, it is anticipated that as microarray technology progresses, most interesting genes will have well established probe sequences and the computational aspects of probe selection will no longer be necessary. When this happens, the transition from probe computation/selection to probe lookup is straightforward. The customer tool is not involved in this process and does not care how the probe was actually selected (computation vs. lookup). Once a sufficient catalog of good probes has been collected, a future version of the customer design tool *could* include specific probe selection.

Another advantage of this invention is that it permits the array customer to visually adjust their array layout on-site, and see precisely what the layout will look like. This avoids complications and errors in communication between Agilent application scientists and the customer, during the process of defining the customer's requirements for the array.

Description of the construction and operation of the invention

Essentially, the invention would consist of a software program with a user interface that could be either a stand-alone program or a web-based application. The user interface would allow the specification of all required layout parameters. It would further include a user-supplied *gene* specification (vs. a *probe* specification) for each non-control feature on the array.

This gene-centric array design would b ovided to Agilent (or any array manufactu). The specified genes would be extracted from the design. Based on how many replicates are specified, the numbe probes per gene is determined. From this information the actual sequence curation and probe selection can take place as usual. The resulting probes can then be laid out in the user-specified pattern.

Below are rough schematic diagrams showing how current array designs are handled (Fig. 1), how we traditionally viewed customer software for array design (Fig. 2), and how this invention proposes to decouple probe selection from array design (Fig. 3).

Figure 1. Current Array Design Workflow

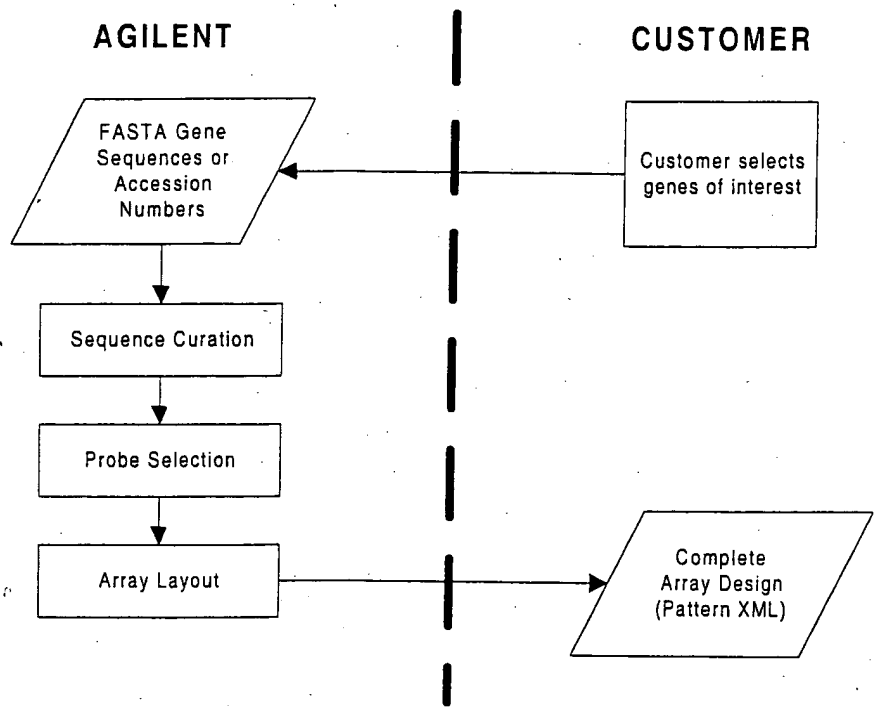

Figure 2. Previously proposed custc r-designed workflow

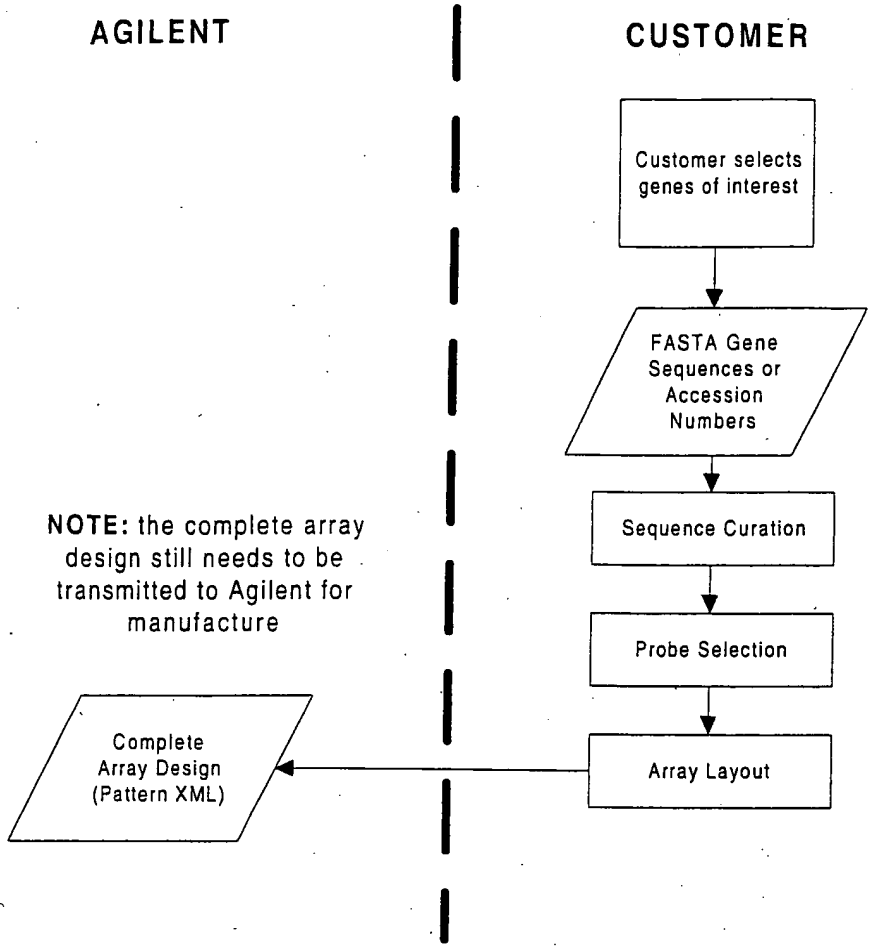

Fig 3. This invention